The
VETERINARY RECORD

Founded by William Hunting, F.R.C.V.S., in 1888

7, MANSFIELD STREET, PORTLAND PLACE, LONDON, W.1. MUSEUM 6541

No. 32 AUGUST 10th, 1957 Vol. 69

Registered for Transmission as a Newspaper *Price 2s. post free*

The Effect of Chemotherapy on the Emergence of Resistant Strains of Bacteria *

BY

H. WILLIAMS SMITH

Animal Health Trust, Farm Live-stock Research Station, Stock, Essex

THE phenomenon of acquired drug resistance is by no means a new one. As early as 1913, Ehrlich noted it in trypanosomes following treatment with arsenical preparations. However, with the widespread use of the modern chemotherapeutic agents, the subject has become very important.

Most of the studies on drug resistance have been concerned with bacterial infections of human beings. In view of this, I shall commence by mentioning, briefly, some of the points that have emerged from these studies before considering veterinary aspects of the problem.

Drug resistance has to be considered from two aspects; its effect on the individual under treatment and its effect on the community. In considering the individual, one is concerned with the danger of the emergence of drug-resistant pathogenic bacteria during the treatment period. These proliferate and produce a relapse in the condition of the patient. Such resistant bacteria may or may not have originated from the sensitive bacterial strain with which the patient was infected. When considering the community, one is concerned with the possibility that continued use of a chemotherapeutic agent will result in a progressive increase of resistant bacteria in the environment with a consequent decrease in usefulness of this chemotherapeutic agent in the treatment of disease in the community.

Several mechanisms have been postulated as playing a part in the development of resistance to chemotherapeutic agents although the actual importance of each mechanism has yet to be definitely determined. These mechanisms are shown below.

1. *The production of extra-cellular inactivating enzymes.* These enzymes are produced during the normal metabolism of some bacteria and they neutralise the action of an antibiotic. A notable example of this is the production of penicillinase by certain strains of *Staphylococcus aureus*.

2. *Adaptation.* This is a non-hereditary change in the metabolism of bacteria whereby they gain the ability to survive in the unfavourable environment represented by the chemotherapeutic agent.

3. *Mutation.* This is an hereditary change represented by the emergence in a sensitive bacterial strain of a very small number of resistant bacterial cells. The change from sensitive to resistant may occur in one step when only one gene is thought to be involved or in progressive steps when several genes are involved. Following mutation, natural selection operates in the presence of the chemotherapeutic agent leading to the suppression of the sensitive bacteria and their replacement in the environment by the resistant mutants. The development of streptomycin-resistance *in vivo* and *in vitro* is a typical example of this particular mechanism in operation.

4. *Natural resistance.* Some groups of bacteria such as Proteus and Pseudomonas are naturally resistant either to all or to most of the chemotherapeutic agents in use. The presence of these agents in a mixed bacterial environment will tend to permit these resistant strains to dominate the sensitive ones.

The available evidence indicates that drug resistance of bacteria acquired *in vivo* is usually of a permanent nature although resistance developed *in vitro* may sometimes be of a temporary nature only.

* Presented to a meeting of the Association of Veterinary Teachers and Research Workers on April 9th, 1957.

The Virulence of Resistant Strains of Bacteria Compared with that of Sensitive Strains

One important aspect of this problem is the virulence of the resistant mutant in relation to that of the sensitive bacteria from which it was derived. In summarising the available evidence, it can be said that resistant mutants developed *in vivo* show little or no difference in virulence from that of the corresponding sensitive bacteria. In some experimental studies it has increased slightly but this is believed to have resulted simply from the effect of animal passage. The effects of passage in bacteriological media may act in the opposite direction, resistant bacteria produced *in vitro* sometimes tending to be less virulent than the drug-sensitive bacteria from which they were derived. Isoniazid-resistant tubercle bacteria that emerge during treatment of human beings are exceptional in that they show loss of virulence for guinea-pigs. However, their virulence for mice is unaltered and the condition of human beings infected with such strains continues to deteriorate.

Bacterial Infections in which Drug Resistance is an Important Problem

In many important bacterial diseases drug resistance presents no problem: not only are *all* the bacteria that are associated with these diseases susceptible to one or more of the chemotherapeutic agents in common use but they have shown no evidence of throwing drug-resistant mutants. In some infections, however, drug resistance has caused serious problems, and the present position is summed up in Table I, being a modification of that devised by Lepper (*Ann. Intern. Med.* (1955). **43.** 299).

The group of bacteria referred to in this table as "non-β haemolytic strep.s." are mainly streptococci of the *Strep. faecalis* and *viridans* types, such as are frequently involved in chronic endocarditis. The coliform group includes *Escherichia coli, Aerobacter aerogenes,* and *paracolon bacilli*. The emergence of resistant mutants in an otherwise sensitive infecting strain and their subsequent dominance over the sensitive bacteria from which they were derived has caused very serious problems in the chemotherapy of tuberculosis in human beings as the table shows. The long course of chemotherapy required in this disease enhances the possibility of such a situation arising. The significance of high natural resistance to chemotherapeutic agents, such as occurs in the Proteus and Pseudomonas groups, is, of course, obvious and assumes greater importance when the broad spectrum antibiotics are employed since they remove many more species of competing organisms than do the narrow-spectrum ones, thus giving organisms of the Proteus and Pseudomonas groups and other resistant bacteria greater opportunity to assume a dominant position in a mixed bacterial population. Drug-resistant strains of *Staphylococcus aureus* are also important in this respect because increase in their numbers in the alimentary tract as a consequence of broad-spectrum therapy has sometimes resulted in fatal staphylococcal enterocolitis in human beings.

The significance of some of the non-β haemolytic streptococci being moderately resistant to chemotherapeutic agents is that high doses for relatively long periods are required in treatment of infections caused by these bacteria with the possibility that the results even then may not be satisfactory and with the consequent dangers of such a policy. Many of the bacteria in the groups referred to in the table also occur frequently in chronic infections or in sites from which they are difficult to eradicate, factors that imply the greater need for longer courses of chemotherapy with the attendant greater dangers of the emergence of drug-resistant bacterial populations.

The presence of large reservoirs of carriers of drug-resistant bacteria assumes its greatest importance in *Staph. aureus* infection of human patients in hospitals. At the commencement of the antibiotic era, nearly all the strains of *Staph. aureus* isolated from hospital patients were sensitive to chemotherapeutic agents. Now, about three-quarters of the strains isolated from similar sources are penicillin-resistant, a state of affairs that coincided with the introduction of larger penicillin dosage in 1946. The extent of the tetracycline resistance of strains of *Staph. aureus* now approaches that of penicillin resistance in hospitals where the tetracyclines are used frequently. In general, the incidence in a hospital of strains of *Staph. aureus* resistant to any particular antibiotic is related directly to the amount the antibiotic has been used there. The position is so serious that the possibility of becoming infected with a resistant strain of *Staph. aureus* is now regarded as a definite hazard of becoming a hospital in-patient.

Methods Whereby the Effect of Drug Resistance can be Minimised

Having referred to the reasons why drug resistance is important in some infections it is now necessary to consider how the difficulties that have arisen can be minimised.

1. *By introducing new drugs.* This is, of course, an obvious approach and requires no explanation.

2. *By using combinations of drugs.* The idea behind this is simply that, in a bacterial population, any bacteria resistant to one of the drugs will probably be susceptible to the other drug in the combination. Or in the case of mutating strains, mutants that arise which are resistant to one drug will probably be susceptible to the other. This method of approach has been employed with marked success in the treatment of tuberculosis in human beings but there are no reports of controlled studies on the use of combinations of drugs in other diseases. It is generally thought that it delays rather than prevents the emergence of resistant bacteria.

3. *By using drugs periodically only in a community.* This is based on the observation that the proportion of resistant strains present in a community increases with increased use of a particular drug. The substitution of another drug results in the proportion of resistant strains to the former drug slowly decreasing to a point when that drug can be used successfully

TABLE I

FACTORS THAT CONTRIBUTE TO DRUG RESISTANCE BEING IMPORTANT IN CERTAIN GROUPS OF INFECTIONS

Contributing factors	Infecting Organisms				
	T.B.	Streps. (non-β haemolytic)	Pseudomonas and Proteus	Coli-forms	*Staph. aureus*
(1) Sensitive strains with resistant mutants that proliferate	++++	+	+	++	+
(2) Moderate natural resistance to most antibiotics... ...		++++	+	+	
(3) High natural resistance to most antibiotics	+++		++++	++	+
(4) Implantations favoured by removal of competing organisms		++	+++	++	++
(5) Present in conditions that hinder eradication of infection	+	+++	++	+++	++
(6) Frequency in chronic infections		++	++	+++	++
(7) Large reservoirs of carriers of resistant strains		+	+	+	++++

The number of + signs indicates the importance of each contributing factor in regard to the resistance status of each group of bacteria.

once more in that particular community. A modification of this policy is to permit the use of a certain drug only in infections caused by strains of bacteria that have been found by laboratory tests to be resistant to all the drugs that are in common use.

4. *By using the minimal effective dose of a drug for the minimal time.* This approach produces the least disturbance in the general bacterial population of a patient so that the selection of resistant bacteria in the population operates minimally.

5. *By using, whenever possible, narrow spectrum instead of broad spectrum antibiotics.* This also produces the least disturbance in the general bacterial population.

6. *By performing adequate bacteriological examinations before treating patients with chronic and/or mixed infections.*

7. *By avoiding cross-infection.* It is important, particularly in hospitals, to take measures to minimise the risk of the interchange of resistant organisms between patients and between nursing personnel and patient. This is particularly important in staphylococcal infection.

8. *By avoiding the use of drugs prophylactically for long periods.*

9. *By implementing surgical, immunological, and sanitary measures when indicated.*

Turning now to the veterinary aspect, there is no evidence to indicate that bacterial resistance is anything like such a problem in the treatment of animal diseases as it is in the treatment of human diseases. I believe one reason for this is that a greater proportion of the bacterial diseases of animals are dealt with by methods other than chemotherapy. Again, the one disease of animals, bovine mastitis, in which chemotherapeutic agents, particularly penicillin, are very commonly used is usually caused by *Streptococcus agalactiae,* penicillin-resistant mutants of which do not appear to exist. There is some evidence to indicate that the proportion of penicillin-resistant *Staph. aureus* that inhabit the bovine udder is increasing. Whether this may be so or not, it has not constituted a problem and it is not responsible for the relatively high proportion of cases of staphylococcal mastitis that fail to respond satisfactorily to chemotherapy.

From the veterinary point of view, it appears that *Escherichia coli* are the only bacteria in which the emergence of resistant strains has been shown to be producing a problem of some magnitude. There has for long been disagreement as to the extent which *E. coli* is associated with disease in animals. However, in view of recent work, particularly that of Professor Lovell and his colleagues, there is no longer any reason to doubt that it plays an important part in white scours in calves, a disease considered to be responsible for 5 to 10 per cent. of the deaths of all calves born in Great Britain. Scours also constitute a serious clinical condition in pigs. The exact part played here by *E. coli* is more obscure—simply because of lack of research work on the subject. Nevertheless, many workers believe that there is an important association between this organism and scours in *young* piglets; the disease process resembles that of white scours in calves, and often chemotherapeutic agents can be successfully employed in treatment *provided* the predominant *E. coli* in the intestinal tract of the affected piglets are sensitive to the chemotherapeutic agent employed. Apart from the scour aspect, recent work in Weybridge has also shown that haemolytic strains of *E. coli* are involved in gut oedema in pigs. In view of all these observations, I believe that any increase in drug resistance of the *E. coli* population of our farm animals should be regarded seriously.

With regard to white scours in calves we, at Stock, have produced evidence to indicate:—

1. That with the increasing use of drugs, the incidence of drug-resistant *E. coli* associated with white scours in calves in this country is also increasing. By means of appropriate sensitivity tests, it has been possible, in some cases, to trace the emergence of such strains during treatment.

2. In herds where chemotherapy of white scours has never been employed, the *E. coli* faecal flora of the calves was almost invariably sensitive to all the

agents commonly employed in the treatment of *E. coli* infections. By contrast, the *E. coli* flora of calves in herds where chemoprophylaxis or intensive chemotherapy with either the sulphonamides, streptomycin, or the tetracyclines, was employed for some time were often found to be resistant to these agents. On some of the farms where all the agents had been employed, severe white scour associated with *E. coli* that were resistant to all these agents was encountered. The institution of chloramphenicol treatment has yielded highly successful results. However, from scouring calves on two of these farms we have recently isolated strains of *E. coli* that are resistant to chloramphenicol as well as to the other agents.

I believe that the ultimate method of controlling white scour lies in the field of husbandry. In the meanwhile, or when husbandry breaks down, we should make intelligent use of the very valuable chemotherapeutic agents available. I believe they should only be used therapeutically and that a course of treatment should not be unduly prolonged. I do not doubt that the prophylactic use of these agents may produce a good effect in controlling scours; there is published evidence to show that this is so. The important question is for how long will the good results continue? The end result, as we have seen in some herds, may be a return to the position before prophylaxis was commenced, with the important difference that one less effective agent will then be available.

Turning to pigs, I think the most interesting aspect of the chemotherapy of their diseases is the impact of the now widespread practice of feeding pigs continuously on diets containing low levels of either one of the tetracyclines or penicillin. As far as the tetracyclines are concerned, we have found that this policy usually results in the great majority of the *E. coli* in the alimentary tract of pigs so fed being tetracycline-resistant. We consider that this state of affairs probably results from selection, the tetracyclines depressing the multiplication of the sensitive *E. coli*, thus permitting resistant *E. coli*, previously present in small numbers only, to occupy a dominant position. During these studies we observed scours in young pigs in some of the tetracycline-fed herds as well as in herds of pigs not fed tetracyclines—scours which it was usually possible to control by the oral administration of streptomycin and chloramphenicol provided the predominant *E. coli* in the faeces of such pigs were sensitive to these agents. These scours were of the type generally considered to be associated with *E. coli*, a view that was supported by the correlation that was obtained between our sensitivity tests and the results of clinical treatment. Some of these outbreaks occurred in piglets weaned at 10 days of age on to a milk substitute containing oxytetracycline. The *E. coli* in the faeces of these piglets were all tetracycline-resistant and they had probably been acquired at birth from their dams who themselves were fed on diets containing tetracyclines. There seems, therefore, good reason for not feeding sows on tetracycline-containing diets, particularly if their progeny are to be early weaned on to milk substitutes also containing tetracyclines. Apart from this aspect, it is not uncommonly claimed that the introduction of this type of early weaning on a pig farm is usually accompanied by success in the first few litters so reared but that poorer results may be obtained later, a state of affairs which is said to be due to a build-up of infection, whatever that may mean. I am wondering whether a more correct explanation lies in the emergence in the weaning pens, through selection, of a predominantly tetracycline-resistant *E. coli* population which the tetracycline in the milk substitute is naturally unable to combat.

There is no reasonable doubt, at least in short-term studies, that antibiotics fed to pigs stimulate their growth. In herds where tetracyclines have been fed for long periods and where the predominant *E. coli*, and possibly other bacteria, are now predominantly tetracycline-resistant, it is fair to assume that tetracyclines will have little effect in controlling any diseases with which these resistant organisms are associated. The decision one has to make is this. Is it better to feed antibiotics continuously for their growth-promoting effect or to reserve their use for feeding for short periods when outbreaks of disease occur or are likely to occur? If the decision is to feed continuously then I believe the logical approach is to permit one antibiotic only to be used for continuous feeding and to keep the others in reserve for chemotherapy. At the present time, both penicillin and the tetracyclines are used in pig feeding in Britain. Additional ones are used admittedly to a lesser extent than these two in U.S.A. If other antibiotics that could be conveniently and usefully fed to pigs become available I believe, as things stand, that they would be sold for such a purpose. The end result of such a policy would probably be a bacterial flora resistant not to one but to several antibiotics. This to my mind would be a very undesirable state of affairs.

GENERAL DISCUSSION

Dr. R. E. Glover (London) congratulated the speaker on his excellent and timely paper, and asked if he considered that the veterinary profession was now at a cross-roads in regard to the production of resistant strains. He felt that human medicine had passed on to the road of no return, particularly with regard to staphylococci. He also asked what was the effect of antibiotics used over a long period on the composition of a bacterial population. Was the suppression of one organism which might possess antagonistic properties likely to favour the emergence of another? He thought that if, after an examination of all the available information about resistant strains, it was felt desirable to limit their use, suitable propaganda might be necessary with a view to promoting legislation for their control.

Dr. K. C. Sellers (Stock) referred to the use of sensitivity tests in clinical veterinary medicine. He pointed out that antibiotics were being used indiscriminately. At Stock a comparatively simple technique was used to indicate within 8 to 12 hours which antibiotic would give the best results in treatment of scouring in calves and pigs and its use had undoubtedly saved the lives of numbers of animals.

This service was being made use of by local practitioners, and he felt that the profession in general was lacking in not using sensitivity tests more frequently.

J. E. Beach (London), referring to the sensitivity tests, said that he thought the method described by the speaker in THE VETERINARY RECORD (**68,** 274) was simpler than the other methods in use. The paper discs were easier to handle than the sensitivity tablets marketed, and he wished to know if the discs described were available commercially.

Dr. W. R. Wooldridge (London) asked what effect the introduction of a mixed bacterial population would have on a resistant population. He felt that the reintroduction of a mixed population, so that the resistant strain was no longer dominant, might be beneficial and reduce the potential danger arising from the selected resistant forms.

Mr. L. E. Hughes (Aberystwyth) asked if resistant strains had any particular characteristics by which they might be recognised.

Dr. A. O. Betts (Cambridge) asked if the feeding of antibiotic supplements to pigs with resistant strains of *E. coli* had any affect on growth stimulation.

Mr. I. H. Pattison (Compton) said that from the veterinary point of view it seemed desirable to differentiate between the production of antibiotic-resistant bacteria through the use of antibiotics (a) as food supplements (b) in the treatment of individual animals for relatively short periods. He wondered if the latter was at all likely to produce resistant strains.

Dr. A. W. Stableforth (Weybridge) asked if the speaker had referred to the same drugs being used prophylactically as well as for treatment.

Dr. K. C. Sellers (Stock) pointed out that when referring to scouring in calves or pigs, large numbers of organisms were being passed in the faeces and would contaminate the building, but that when considering organisms causing mastitis it should be realised that the infected milk was not spread over the cow shed.

The Chairman, Professor D. L. Hughes (Liverpool), invited members present who had experience of the development of resistant strains of organisms causing mastitis to give their views.

Dr. W. R. Wooldridge (London) said that such information related to mastitis caused by *E. coli* would be particularly valuable.

Dr. Sellers (Stock) said that from 57 herds selected at random in East Anglia, 9 strains of staphylococci resistant to penicillin had been recovered. These were individual samples from cows which were clinically normal.

Professor D. L. Hughes (Liverpool) pointed out that more resistant strains would be obtained from clinical cases than from samples from normal individuals.

Mr. R. M. Loosmore (Reading) said that penicillin resistant strains of staphylococci were appearing in an increasing number of clinical milks received at the Reading Centre, but regretted that he had not brought the figures to support this observation. He had found that streptomycin-resistant organisms appeared in the milk very rapidly following herd blitz treatment with streptomycin preparations.

The figures supporting the above treatment are that the percentage of penicillin-resistant *Staphylococcus aureus* cultures isolated from clinical cases of mastitis has increased from 40 to between 60 and 70 per cent. over the last year.

Dr. F. T. W. Jordan (Liverpool) asked about the incidence of antibiotic-resistant strains unassociated with any antibiotic treatment.

Professor E. G. White (Liverpool) wondered to what extent the restriction of antibiotics in animal feeding-stuffs to one antibiotic only might help to avoid the danger of the development of resistant strains on the farm. Dr. Williams Smith had mentioned this in passing. Did he think it would be a helpful procedure, or was he altogether against extending the use of antibiotics in feeding-stuffs to calves?

Dr. J. H. Taylor (London) said that the selection of one antibiotic for animal feeding purposes would not be easy because certain groups of antibiotics tended to show cross resistance. It would also be difficult to find one antibiotic which would be effective in all species under all conditions. In the calf, for example, only the tetracyclines appeared of benefit in promoting growth. He also pointed out that the value of an antibiotic was not necessarily inversely proportional to the extent to which it had been used, as suggested by Dr. Williams Smith, but rather to the manner in which it had been used. Antibiotic feed supplements had been used more extensively than therapeutic preparations but, in contrast, their use had not so far been associated with any untoward results.

Dr. N. S. Barron (Reading) referred to the difference between human and animal populations. As animals probably had far greater opportunities of being reinfected with sensitive organs, he wondered if this was the mechanism why animals appear to be less affected by resistant strains than human beings. He also asked if we were encouraging mutations by including antibiotics in animal food or whether they occurred all the time.

Dr. A. W. Stableforth (Weybridge) thought that, although the proportion of resistant strains was as yet generally lower than in hospitals, in practice by encouraging resistant strains we should reach a point where a large part of the bacterial population was antibiotic resistant.

THE SPEAKER'S REPLY

Dr. H. Williams Smith said that he was in agreement with Dr. Glover's remarks on resistant bacterial strains. Although in human medicine resistant strains in hospitals were more common than in veterinary practice, the veterinary profession must be very careful to see a similar position was not reached. The dynamics of the bacterial population of the gut

was extremely complex and we really knew very little about what happened when we interfered with it. He had found in several herds of pigs that resistant strains of *E. coli* remained dominant amongst the alimentary bacteria for at least 6 months after tetracycline feeding had been discontinued. He pointed out that these herds were closed communities.

In answer to Mr. L. E. Hughes, he said that as far as was known there were no other bacterial characteristics linked genetically with resistance.

Replying to Dr. A. O. Betts he said he had no information to offer about the growth effect of antibiotics fed to animals harbouring resistant strains of *E. coli*. He thought it was possible that the beneficial effect might still be obtained because antibiotics were thought to act by suppressing many kinds of bacteria of low pathogenicity. Consequently, the effect might continue by suppressing undesirable bacteria other than *E. coli*. With regard to piglets weaned early on to tetracycline-containing milk substitute, it was sometimes a question not of stimulating their growth but of actually keeping them alive when the *E. coli* in their alimentary flora were tetracycline-resistant.

Replying to Mr. Pattison's question he said that the necessity to treat individual cases of white scour for short periods might eventually lead to the development of resistant strains of *E. coli* if it were necessary to carry out this procedure in a large proportion of the animals in a given community. However, the resistant strains would never arise so quickly as they would if the drugs were either given prophylactically or used as feed additives. He had studied for several years the histories of herds where it was now found that the *E. coli* present were resistant to most of the modern therapeutic agents. By successively using sulphonamides and the other antibiotics this resistance had been built up. If antibiotics had not been used on these farms high losses would definitely have been encountered. His only advice was that husbandry should be improved and that drugs should be used as sparingly as possible.

In reply to Drs. Jordan and Barron he said that tetracycline-resistant strains of *E. coli* could be found in a proportion of pigs not fed tetracyclines, and that the tetracyclines acted selectively and encouraged these strains. There was no evidence to indicate, nor was it thought likely, that they encouraged mutation.

In replying to Professor White, he felt very strongly that the routine use of antibiotics in feeding-stuffs should be restricted to one antibiotic only, particularly as the different types of antibiotic appeared to have the same type of growth effect and no better effect was usually obtained by feeding two antibiotics together than by feeding either separately. He did not think it wise, at present, to consider extending the use of antibiotics in feeding-stuffs to calves. There was a great need to develop a correct sense of proportion with regard to the routine use of antibiotics in animal feeding. It should be borne in mind that the more kinds of antibiotics that were employed in feeding animals, the more complex and difficult would become the task of providing effective chemotherapy for the control of clinical disease in such animals.

Acuaria uncina ta Infestation in Domestic Geese and Ducks

BY

E. A. GIBSON

Veterinary Investigation Centre, Cambridge

AND

E. G. BARNES

Dereham

ACUARIA uncinata is described in *Mönnig's Veterinary Helminthology and Entomology* (Lapage, 1956a) as occurring in the oesophagus, proventriculus gizzard and small intestine of ducks, geese, swans, and wild aquatic birds. It appears to be not uncommon in British wild aquatic birds. Thus Venn (1954) stated that a considerable degree of Acuaria infestation had been encountered in a closed community of wild fowl. It is, however, apparently uncommon in domestic fowl in this country, and the only reference to its occurrence is that of Buxton, Ford, and Munro (1952) who described an outbreak among domestic ducks in Lincolnshire. In this outbreak the disease was first seen in an acute form and many birds died with no premonitory symptoms. Later a more chronic form of the disease was seen, death being preceded by progressive emaciation. The mortality was heavy, and 8 weeks after the onset of the outbreak only 37 out of 250 ducks remained alive.

There are no references to the occurrence of *A. uncinata* infestation in domestic geese in this country. The purpose of this communication is to report such an outbreak together with a further outbreak in domestic ducks. These 2 outbreaks were cited by Lapage (1956b).

Outbreak in Domestic Geese

This outbreak occurred near Dereham, in Norfolk. In May, 1953, 10 goslings, about 10 days old, were bought from a local market and put into a 30-acre grass paddock. This paddock already contained 18 home-bred Aylesbury ducks together with 3 older geese kept over from the previous year. All the birds had access to a stagnant pond and also to a fast-flowing stream.

The goslings appeared to thrive normally until they were 14 weeks old, when one was found dead. The owner regarded this as an accidental death and did not submit the carcase for examination. She noticed, however, that all 9 remaining goslings were in poor condition, and that instead of grazing normally they spent the day waiting for their grain ration, which they ate ravenously. Four weeks later a second death occurred. *Post-mortem* examination of this carcase showed the presence of a heavy infestation with *A. uncinata*. Following this diagnosis the remaining 8 goslings were each dosed with a 1 c.c. capsule of carbon tetrachloride. A third death occurred a few days later and a fourth bird, in very weak condition, was killed on September 24th, about a week after treatment. The 6 remaining goslings slowly improved in condition until they were killed, at Christmas, for table use.

E. A. GIBSON & E. G. BARNES.—*ACUARIA UNCINATA* INFESTATION IN DOMESTIC GEESE AND DUCKS

FIG. 1

Proventriculus and gizzard of goose infested with *A. uncinata*, showing parasitic nodules scattered over the surface of the proventriculus.

FIG. 2

Microphotograph of a typical nodule from the proventriculus of a duck. The parasite is seen in section within a lacuna. The submucosa shows a diffuse cellular infiltration, together with a deposition of fibrous tissue, while the mucosa shows a massive infiltration with eosinophils.

× 80.

Post-Mortem *Findings*

Examination of the second dead gosling showed that the carcase was emaciated. Removal of the sternum disclosed that the lower part of the oesophagus was distended to about 4 times its normal size and that the proventriculus was distorted by numerous nodules that lay under the surface of the serosa. The mucosa of the proventriculus was covered with thick mucus and studded by numerous firm nodules up to about 15 mm. in diameter. These formed a continuous ring across the upper third of the proventriculus at its junction with the oesophagus, while a few smaller nodules were scattered over the remainder of its surface. This ring of nodules had apparently obstructed the passage of food material, thus causing the dilatation of the oesophagus.

On incision, most of the nodules were found to contain firm, caseous material, in which were embedded from 3 to 6 white, translucent roundworms, about 10 to 15 mm. long. These were identified as *Acuaria uncinata*.

Examination of the other 2 carcases disclosed very similar changes, except that in the gosling which was killed, the nodules were scattered over the surface of the proventriculus instead of forming a ring. A few nodules were present on the anterior portion of the gizzard (Fig. 1). The oesophagus of this bird was not distended.

There was no evidence of any other significant parasitic infestation or bacterial infection.

Histopathology

The histological examination of an apparently typical nodule, taken from the proventriculus, showed that the lesion chiefly affected the submucosa. The parasite, which had penetrated into the submucosa, lay within a lacuna, surrounded by a wide, fibrous capsule, which was relatively avascular. Scattered eosinophils were present throughout this capsule, while heavier concentrations were present in its outer portion. Concentrations of small lymphocytes were also present.

The submucosa showed a marked increase in fibrous tissue. The lymph follicles were hyperplastic, as evidenced by their increased size and the more intense staining reaction of their cells. In places the cellular infiltration with eosinophils and small lymphocytes extended into and between the layers of the muscular tunic, while in others it penetrated between the tubular glands of the mucosa, which showed an increased secretion of mucus. The adventitia exhibited a moderate degree of thickening.

Possible Sources of Infestation

A. uncinata requires an intermediate host, *Daphnia pulex*, the water flea, for the completion of its life cycle. Lapage (1956a) cites Hamann as stating that the eggs of *A. uncinata* are voided in the faeces of its definitive host, are swallowed by the Daphnia, and develop into infective larvae. If the Daphnia are swallowed by suitable aquatic birds, these infective larvae penetrate the alimentary mucosa of the bird and develop to maturity. Marotel and Pierron (1947) described the examination of Daphnia taken from a stagnant pond on which were ducks infested with *A. uncinata*. They found that nearly all the Daphnia contained nematode larvae, 1 to 2 mm. long, in their abdomens. Hamann (cited by Neveu-Lemaire, 1936) also states that the larvae of Acuaria can be demonstrated in the body cavity of infected Daphnia.

In the outbreak under discussion, the goslings may have been infested before they were purchased. Unfortunately, it was not possible to trace the farm from which they came, with the result that no evidence is available on this point. Alternatively, the infestation may have been contracted after purchase, either from the Aylesbury ducks and adult geese with which the goslings were running, or from the wild fowl that frequented the pond. In either case, infestation must presumably have occurred through the medium of infected Daphnia. Examination of the pond in mid-September showed that it was, in fact, teeming with large numbers of Daphnia and Cyclops, but examination of these failed to show any nematode larvae. There was no history of losses or illness among the ducks or geese during the previous 5 years, and those in contact with the affected goslings appeared to remain healthy throughout the outbreak. Six samples of duck faeces were collected from the pasture and examined for the presence of Acuaria eggs, but with negative results. Two moorhens (*Gallinula chloropus*) were shot for examination, but these showed no evidence of Acuaria infestation.

Subsequent History

No losses from Acuaria infestation occurred in the geese kept in the 3 subsequent years, 1954-5-6.

Outbreak in Domestic Ducks

This outbreak occurred near Bungay, in Suffolk, and was investigated by one of us (E. A. G.) through the courtesy of Major Wortley, M.R.C.V.S., of Bungay.

The outbreak involved 2 batches of home-bred white Aylesbury ducks, kept together with a few geese, turkeys and chickens in a field that contained a stagnant pond. During the winter months this pond received water from a nearby river, on which wild fowl were plentiful.

The first batch of 20 ducklings was hatched in June and appeared to thrive normally until October. They were then seen to be losing condition despite the maintenance of a good appetite. When they were killed at the end of November, for table use, the carcases were found to be in poor condition. The owner stated that the proventriculi were thickened and enlarged and that the mucosa was covered by thick mucus. All 20 birds were affected in this way.

The second batch, also of about 20 ducklings, hatched about 2 weeks later. These also appeared to thrive normally until November when, despite a ravenous appetite, they started to lose condition. Some of the birds were seen to vomit. In some ducks, the loss of condition proceeded to the extent of emaciation. No deaths occurred, but at Christmas half the birds were rejected as unfit for table use. All 10 birds showed a similar enlargement and

thickening of the proventriculus, which, in some cases, was about twice its normal size. One bird was submitted for *post-mortem* examination. This showed lesions similar to those described above as occurring in affected geese. The proventriculus was thickened and distorted by numerous nodules. These contained a quantity of inspissated material in which were embedded several *A. uncinata*. No other abnormalities were found. The histology of a typical nodule was similar to that described above, but the parasite was situated more deeply, within the muscular tunic. There was evidence of early encapsulation with granulation tissue. The mucosa showed a massive infiltration with eosinophils, while a diffuse cellular infiltration, together with a deposition of fibrous tissue, was present in the submucosa. These findings indicate that this lesion, which is shown in Fig. 2, was of more recent origin than the one described previously.

Examination of the pond in the following January showed that a few Daphnia and Cyclops water fleas were present. No nematode larvae could be demonstrated in those which were examined.

Discussion

It appears that although infestation with *A. uncinata* is rare among domestic birds in this country, it may, on occasion, be the cause of considerable economic loss. The best example of this is the outbreak described by Buxton *et al.* (1952) in which 213 (85 per cent.) of a flock of 250 ducks died within a period of 8 weeks. Although the two outbreaks that we have reported above were less severe than this, they also caused appreciable losses. Thus, in the outbreak in domestic geese, all 10 birds appeared to be affected; 3 deaths were attributed to Acuaria infestation and a fourth bird was very emaciated when killed for examination. No deaths occurred in the outbreak in domestic ducks, but the infestation apparently caused a marked unthriftiness in all 40 birds, 10 being so poor as to be unfit for table use. It is interesting to note that despite the chronic nature of this outbreak no difficulty was experienced in demonstrating the presence of Acuaria in the one duck that was examined. This is in contrast to the findings of Buxton *et al.* (1952) who stated that whereas in the early stages of their outbreak the proventricular nodules were tightly packed with worms, the nodules found in birds that died 5 weeks later contained only inspissated pus, in which no parasitic worms could be demonstrated.

In discussing the origin of the outbreak in Lincolnshire, Buxton *et al.* (1952) suggested that wild aquatic birds may have introduced the parasite by depositing infected faeces in a lake infested with Daphnia. They were, however, unable to offer any evidence to support this suggestion. The 2 outbreaks described above may also have originated in this way, since both occurred in districts in which wild water-fowl are common, and in both instances the affected domestic birds had access to ponds infested with Daphnia. As indicated above, however, no evidence is offered to support this suggestion, nor can one rule out the possibility that the disease may have been acquired from the other domestic birds on the premises.

Our failure to demonstrate the presence of Acuaria larvae in the Daphnia which we examined may have been due to the interval which had elapsed between the probable time of infection and the collection of samples. Thus Hamann (cited by Neveu-Lemaire, 1936) states that, under summer conditions, infected Daphnia and the Acuaria larvae which they contain will die within 2 or 3 months. This is supported by Pennak (1943) who cites MacArthur and Baillie (1929) as stating that *D. magna* lives an average of 26 and 42 days at 28° and 18° C. respectively.

Summary

Two outbreaks of *Acuaria uncinata* infestation are described, one in a flock of domestic geese and the other in domestic ducks. The geese suffered a mortality of about 30 per cent. No deaths occurred among the ducks, but the whole flock became unthrifty.

No previous record has been found of the occurrence of *A. uncinata* in domestic geese in this country.

Acknowledgments.—We wish to thank Dr. G. Lapage, late of the Department of Animal Pathology, Cambridge, for the identification of the parasite, the examination of faeces samples and specimens of Daphnia, and for his encouragement in the preparation of this paper.

References

BUXTON, J. C., FORD, C. M., & MUNRO, I. B. (1952). *Vet. Rec.* **64**. 5–6.

LAPAGE, G. (1956a). "Mönnig's Veterinary Helminthology and Entomology." 4th ed. 266. Baillière, Tindall & Cox, London.

LAPAGE, G. (1956b). "Veterinary Parasitology." 212. Oliver & Boyd, Edinburgh.

MAROTEL & PIERRON. (1947). *Bull. Acad. vet. Fr.* **20**. 41–43.

NEVEU-LEMAIRE, M. (1936). "Traité d'Helminthologie Médicale et Vétérinaire." 1,276–9. Vigot Frères, Paris.

PENNAK, R. W. (1953). "Fresh-Water Invertebrates of the United States." 358. Ronald Press Coy, New York.

VENN, J. A. J. (1954). Personal communication.

UFAW LUNCHEON AT CAMBRIDGE

Following last year's successful innovation, UFAW are holding a luncheon during congress week. It will take place in the dining room of West Lodge, Downing College, at 12.45 for 1 p.m. on August 26th. The cost will be 9s. per person. It is hoped that as many members of the Veterinary Section of UFAW as possible will attend, and those proposing to do so are asked to inform Miss M. P. Williams, at 7a, Lamb's Conduit Passage, London, W.C.1, not later than August 18th. Cash for ticket(s) should be enclosed.

Partnerships in Veterinary Practice

The following article is published officially by the Association in the hope that it may prove a useful guide to members.

Preliminary

THE object of this Memorandum is to direct the minds of those contemplating joining veterinary partnerships to the points of most importance which they should discuss with their intended partners and which should be the subject of agreement between them. It is not designed to make it unnecessary for a veterinary surgeon to consult a solicitor before entering into partnership. In the view of the Association this is a precaution which should not be omitted.

Some may have doubts in their own minds about the need for a legal agreement. They trust their intended partner or partners, or they would not be thinking of going into partnership, and are tempted to content themselves with a gentlemen's agreement. They should remember that experience shows that it is not always possible to rely on good intentions. Without being a rogue, a man can genuinely forget his promises; under pressure of circumstances gentlemen's agreements become capable of being interpreted quite differently by the two parties, and if the partnership dissolves into a series of disputes, as a few inevitably do, the gentlemen's agreement is powerless to resolve them. The legal agreement is designed to protect the parties' rights in the case of disagreement. Lastly, it should be remembered that one may have to deal not with one's partner but with his executors, who have a duty to perform towards the beneficiaries in the estate.

It is normal for the established practitioner to have the first draft of the partnership agreement prepared and to submit it to the newcomer for approval. It will save expense if, before this is done, the following matters are discussed and if possible agreed between the partners.

Where the partnership is entered into with a view to the early succession of the newcomer to the whole practice, certain provisions are required and a very definite period of time which should elapse before complete succession must be clearly stated.

It cannot be emphasised too strongly that there should be no delay in having an agreement drawn up and signed. There are cases on record where a prospective partner has purchased a house and settled in a practice only to find later that there were strong differences of opinion in regard to major clauses of the proposed partnership agreement.

The Goodwill of the Practice

The goodwill of a veterinary practice represents a saleable asset. It is therefore usual for a new partner on being admitted into a partnership to be required to pay a premium representing the purchase price for that share of the goodwill of the practice which he will take. The guidance in the matter of valuation of goodwill will no doubt be expected to form the most important part of this memorandum, but for reasons which follow the Association has found this matter the most difficult in which to make definite recommendations.

Before World War II, the value of a practice was often taken as (a) the gross annual turnover based on the average of the previous 3 years, or (b) the accumulated net profits over the previous 3 years. Most of the good single-man practices, however, of which there were many more in those days, made 50 per cent. and even sometimes 75 per cent. profit, and these tended to sell by the second method, *i.e.* (b), which was virtually the same as selling at $1\frac{1}{4}$ or so of the gross turnover. The larger practices tended to make only about $33\frac{1}{3}$ per cent. profit, so that whether they were sold by the first or the second method the figure was the same. Since World War II, gross turnovers have increased enormously, but owing to the introduction of expensive sulphonamides, antibiotics, biologicals, and other expensive overheads, the net profits have tended to fall, and furthermore the number of 2- or more man practices has increased enormously. Therefore, in post-war years, neither of the already mentioned methods of valuation is entirely applicable.

In order to learn how other professions value goodwill, the B.V.A. has consulted the appropriate associations of the dental, medical, legal, chartered auctioneers and estate agents' professions, and the Institute of Chartered Accountants. It is found that these bodies are in the same difficulty as the B.V.A. but each implied that there is a marked tendency to take the net profits more and more into account in computing the goodwill valuation.

The B.V.A., therefore, finds that it is impossible to make specific recommendations in regard to goodwill valuation, but it can offer some general guidance on matters which have always been applicable to a veterinary practice, and relate to the variation of valuation according to local conditions.

The ideal practice for which prospective partners will look will usually have the following features: a guarantee that the partnership will last at least 2 or 3 years; an unopposed practice which, for geographical or other reasons, is likely to remain so; a compact practice and one economic to run; prosperous animal-owners in comfortable circumstances who make full use of the veterinary profession; good public appointments; a well-organised practice with a permanent staff, both professional and lay, and available premises conveniently situated, and offering good security of tenure. The absence of any of these conditions will usually justify a reduction in the purchase price to be paid. The small 1- or 2-man practices will tend to command a relatively higher price than the large multiple practices.

Because goodwill has this sale value and because in many cases it represents the sole, or at least the major, asset of the veterinary surgeon, the framework of the partnership should be so designed to provide the maximum security for this goodwill. This can best be done by providing that the partnership shall

continue indefinitely, each partner being given the right of retirement from the partnership on proper notice, in which case he is required not to practise as a veterinary surgeon for a specified number of years within a suitable radius from the central point of the practice. Where the premium is not fully paid in cash at the inception of the partnership, the partnership agreement should set out the instalments to be paid, the date they fall due, and the interest to be paid on the outstanding balance.

Clauses to Cover Death or Retirement of Partner

When a partner retires, or dies, the other partner is often placed under obligation to buy his share of the goodwill at a stated price. Alternatively, if it is thought this imposes too great a financial burden, it can be provided that he shall have an option to buy the share of goodwill and that if that option is not exercised within a reasonable time (say a month) the retiring partner or the deceased partner's executors shall have the right to sell that share to a new partner who would (subject to the approval, which should not be unreasonably withheld, of the continuing partner) be taken into partnership by him.

The method of payment of the purchase price by the continuing partner should be stated in the partnership agreement, *i.e.* whether in cash, or by what instalments, at what dates, and at what rate of interest.

Consideration should also be given to whether, in a partnership of 2, the price to be paid by the surviving partner should be reduced if the other partner died during the first 2 years.

It is quite normal for practitioners to be content that there should be no obligation on their partners to buy their shares in the case of retirement, but this arrangement is not one which can be recommended to apply in the case of the death of a partner. Purchasers for veterinary practices are not always easy to find and it does not take much imagination to realise that the widow or the executors of a deceased partner endeavouring to sell his share in the open market may well fail to obtain anything approaching its true value. Moreover, the essential feature in ensuring the saleability of the share is the right to a partnership with the survivor. In fairness, the survivor must have the right, in reason, to approve his prospective new partner, and this places the executors very largely in his hands. The surviving partner may realise that if he deters prospective purchasers from purchasing his late partner's share he will be able to acquire it himself at a cheap price. The best way to avoid this temptation is to make it obligatory on the survivor to buy.

Where a surviving partner or partners purchase a share of a deceased or retiring partner, arrangements can be made for them to do so by instalments, paying reasonable interest on the money which remains owing.

This, then, should be the general framework of the partnership: the purchase of an initial share; a partnership indefinite in time, with the right to each individual partner to retire after appropriate notice; in those circumstances his share is bought either by the other partner or by a new partner who joins the continuing one in partnership, and the retiring partner ceases to practise in the district. By this means the goodwill of the practice as a whole can be kept intact and its value preserved, and the partners are given the best means of realising the monetary value of that goodwill on their retirement or death.

Appointments

Veterinary appointments are not necessarily transferable to a successor. Therefore, while it is reasonable to include the remuneration from appointments when calculating the price to be paid by an incoming partner, because he will share as a partner in that remuneration, it is generally fairer to exclude it when calculating the price for the share of a partner leaving the partnership.

There are, however, exceptions to this rule and cases where it is obviously right that—to an extent, at least—the remuneration from an appointment should be included in calculating the price even in these circumstances. An example would be where the partner leaving the partnership had worked as a local veterinary inspector for the Ministry of Agriculture, Fisheries and Food.

Shares

It is normal for a junior partner to start with a share less than that of the senior. A common arrangement would be for the junior partner to start with a one-third share, the senior having two-thirds. The partnership deed may, however, contain provision for the increase of the junior partner's share; whatever is agreed on in this respect should be clearly set down. These increases will normally be achieved by the purchase by the junior partner of 1 or more further fractions of the original estimated price of the goodwill and profits. Books will be started anew when the partnership commences, and it will probably be necessary to make provision for sufficient capital to be available, by loan or other means, for the purposes of running the practice. This may not be applicable where there is a number of partners.

Accounting Provisions

The expenses of the practice should be clearly defined. It is usually easy to decide what expenses should fall on the partnership, but there are sometimes differences of view about motoring and surgical instruments. Both are essential for the practice and are obviously allowable for income-tax purposes. It is suggested that the problem of motoring might be solved by the cars being owned either by the firm, or by the individual partners charging on a mileage basis. The amount that can be claimed as an income-tax rebate for motoring is not affected whichever alternative is chosen.

Provision should be made for the opening of the bank account in the name of the partnership into which all receipts on behalf of the partnership should go, and out of which all expenses should be paid. It should also be provided that receipts should go into the bank exactly as they are received—that is to say,

by cheque, cash, or otherwise. The system whereby cash receipts are retained in the surgery and used for petty expenses is a bad one; it is likely to lead to doubt as to whether all cash receipts have been accounted for, and to muddle and inefficiency. The normal arrangement is for cheques on the partnership bank account to require the signature of both partners; it is usually also arranged that cheques for payment-in can be endorsed by 1 partner only. There is of course no objection, if the partners prefer it, to either partner being at liberty to sign cheques on the partnership account, up to a certain amount, and it is suggested that this might be the better arrangement, keeping in mind particularly the possibility of severe illness or absence from home.

Next there must be a provision for an annual account of the profits to be taken by an accountant. This will in most circumstances be required for income-tax purposes. In addition to that, there should be a provision for the partners' drawings on account of their shares. They can do this in a variety of ways. They can divide up a fixed amount each month, this amount being calculated so as to ensure that they never overdraw the amount likely to be available as profits each month. Alternatively they can divide up whatever is left in the bank account after paying expenses at the end of each month, or at the end of each quarter. Alternatively again, they can arrange that whenever the partnership account has a fixed sum in it, say 100 points, it is divided up between them. Some banks will do this automatically on behalf of the partners. In all cases provision should be made for the maintenance of a small balance at the bank at all times. Yet another method of dealing with this matter is to divide up a proportion of the net available profits and to leave the remainder in the partnership account to build up a reserve fund for income-tax. It must be remembered that each partner is individually liable to the Revenue for the whole of the income-tax on the partnership profits (this does not apply to surtax).

The Surgery Premises

The importance to the practice of the surgery premises is frequently overlooked by those entering partnerships as junior partners, who really are those who should pay the most attention to the matter. A good deal of the practice goodwill often attaches to these premises. The junior partner should therefore make it his business to find out who owns these premises. If they are the freehold property of the senior partner then he knows that the senior partner can ensure their availability for the use of the partnership throughout the term of the partnership. If they are leasehold premises only, then the junior partner should find out the length of the lease, the prospect of renewal at the end, and so on.

The expenses of the surgery should obviously be paid by the partnership. No difficulty arises where the premises are separate and apart from the house in which either partner lives, but where the surgery premises form part of one partner's private house, it may be necessary to seek the advice of an accountant to ensure that the partnership repay to that partner an amount appropriate to cover the expenses which he incurs by having the surgery at his house.

Another matter of particular moment for the junior partner is to ensure that if he takes over the share of the senior partner on his retirement from the partnership or at his death, he shall also be able to take over the surgery premises. In many cases the share of the senior partner will be of little value to him without these premises; he should therefore take care to reserve to himself an option over them, but the price of such premises, or alternatively the method fixing it, should be stated in the partnership deed. These comments apply as much to any branch surgery as to the main surgery.

Drugs and Instruments

It is usual for the incoming partner to buy his proportionate share of drugs and instruments from the existing partner or partners, the price being fixed by an independent valuation.

Holidays and Sickness

Because the partnership is a business transaction the partnership agreement should make provision for the partners' entitlement to holidays, how long they shall be allowed to take in each year, and whether the senior partner claims any priority of choice. It is not usual in veterinary practice for a locum tenens to be necessary during a partner's holiday, but if such a need did arise, the cost should be borne by the partnership, not by the partner on holiday. A partner earns his holiday by the work he does, and it is in the interest of the partnership as a whole that he should take it or he will go stale; he should not be deterred from taking it by the fear that he may have to stand himself the cost of a locum tenens.

Where a partner goes sick, however, different considerations arise. A locum tenens may then be necessary and if so should be provided at the expense of the sick partner. It should be made clear in the agreement who is responsible for this and for how long. Sickness is an individual risk against which a partner can insure himself if he wishes; indeed, it is generally a wise measure to do this.

Permanent Incapacity

A partner's sickness may be prolonged and may even develop into a permanent state. Obviously it is desirable that if one partner is permanently incapacitated the other partner should have the right of determining the partnership. On the other hand it is rarely that doctors or specialists will be willing to certify that anyone is "permanently incapacitated." But in legal agreements the provisions must be exact and capable of interpretation without undue difficulty. Therefore it is unwise to use in a partnership agreement any phrase such as "permanent incapacity" which is incapable of definition and may have to be established by evidence which, as we have seen, is difficult to come by. The only satisfactory way out of the difficulty is to lay down a certain period of time, say 6 or 9 months in any 1 year, which shall be the permitted period of absence of a sick partner. If the incapacity continues beyond this period then the other partner should be able to dissolve the

partnership if he wishes. If the partnership is determined by reason of a partner's permanent incapacity, provision must be made for dealing with his share, and the fairest provision is that he should be treated as if he were dead. If the partners have decided to distinguish between the case of retirement and the case of death so far as the purchase price of the retiring or deceased partner's share is concerned, then the true analogy with the case of permanent incapacity is the case where the partner has died, because the opportunity for introduction to clients is not usually available. As in the case of the death of one of two partners, so in the case of permanent incapacity, consideration should be given to whether the price of the share should not be reduced if the total incapacity of the senior partner occurs during the early months of the partnership, thereby bringing the arrangement into line as if death had occurred.

Dissolution for Misconduct

There should certainly be in every partnership agreement a general clause requiring that each partner shall be " just and faithful to the other in all matters appertaining to the partnership "; equally, there should be a provision that if a partner misconducts himself, if his name is erased from the Register or he is suspended from practice, if he goes bankrupt, or if he so behaves himself that the partnership goodwill is, or is in danger of being, seriously injured, the other partner can dissolve the partnership. In any such clause it is necessary to have in mind the damage which the offending partner can do to the goodwill of the partnership, and for this reason some prefer that there shall be no question of the purchase of the offending partner's share of goodwill by the other partner. In those circumstances it is manifestly unfair that the expelled partner should be restrained from practice in the neighbourhood, so that the effect of this provision is that the partnership is dissolved and both partners are free to continue to practise in the neighbourhood in competition with each other. Bearing in mind that the expulsion by one partner of the other inevitably gives rise to considerable ill-feeling between them, it is not considered that this is likely to be a satisfactory arrangement. It is therefore recommended that even in the case of expulsion the share of the expelled partner should be bought by the other, but that the purchase price should not be the full price paid in the case of retirement, sickness, or death, but should be one-half of the death price, the difference being a penalty for the harm which the necessity of expulsion causes to the partnership goodwill.

Restraint of Practice

We have already indicated that a partner who has retired or has been expelled and whose share has been bought by the other should be restricted from practice in the neighbourhood in competition with his former partner. This may seem a reasonable enough requirement, but the law has always leant against the enforcement of this type of clause, and to be effective it must be very carefully drawn. In no circumstances must the restriction put on the retired partner be wider, either in point of distances or time, or in respect of the work which the retired partner is debarred from doing than is reasonably necessary for the protection of the continuing partner, having regard in particular to the scope of the practice and the work done. *If it is held by a Court to be unreasonably wide, it will not be cut down to what is considered reasonable, but will be altogether void.* It should be remembered that, in the absence of a bond, the powers of the Royal College of Veterinary Surgeons in restricting practice on ethical grounds are extremely limited.

Winding Up

The dissolution or winding up of a partnership does not only consist of paying to the retiring partner the value of his share in the goodwill. It is necessary to take a final account of the profits down to the date of dissolution. There will also be the retiring partner's share of any outstanding book debts owing from clients; there should therefore be a provision that the continuing partner should collect these book debts and pay over to the retiring partner his share in them, after deducting the reasonable expenses of collecting them. It is wise to make provision for a fund to pay income-tax due by the retiring or deceased partner. The Inland Revenue will have been assessing tax on the year preceding the current year but on retirement or death the tax will be calculated to the date of such retirement or death. As already stated, each partner is individually liable to the Revenue for the whole of the income-tax on the partnership profits. It may be that there will be certain capital assets owned jointly by the partners. These usually consist mainly of the equipment of the surgery, but some veterinary surgeons make their motor cars partnership property. In all cases where a share of goodwill is bought it is convenient for a similar share of these partnership assets to be transferred at the same time and when a partner leaves the partnership for any reason it is, of course, necessary to buy from him his share of these assets.

Arbitration

A clause should always be included that disputes should be referred to arbitration under the Arbitration Acts, which is usually both cheaper, more expeditious, and more flexible than litigation, and also avoids publicity. To avoid any possible difficulty in agreeing on an arbitrator it may be wise to provide for nomination by the Royal College of Veterinary Surgeons or the British Veterinary Association.

Salaried Partners

A request has been made to the B.V.A. to make some statement regarding salaried partners. This term is used vaguely and is often misleading. It appears that some assistants are termed partners in order to make them more acceptable to clients and at the same time they are given a guaranteed wage with a bonus over and above. Such an arrangement makes these persons little, if any, different from other assistants. There is, however, such a thing as a genuine salaried partner but, unless the partnership agreement is carefully thought out and worded, there are dangers to both partners. On the one hand a

(*Concluded opposite*)

Book Reviews

Dextran and its use in Colloidal Infusion Solutions. By ANDERS GRONWALL, M.D., Stockholm, Almquist & Wiskell: Oxford, Blackwell Scientific Publications. Pp. 156. 1957. 20s. net.

Colloidal solutions as substitutes for blood plasma were first used some 40 years ago, but of the colloids used as such since that time none approaches more closely to the ideal than dextran, introduced by Professor Grönwall in 1944. This book is a review of the literature on the chemistry of dextran, its production and preparation for clinical use, and experimental and clinical investigations of dextran as a plasma substitute. The author has produced a generally lucid and compact account of a wide field of study. The book is presumably intended for the clinician, whether general or specialist, and it is unfortunate that the structure and physical chemical properties of dextrans should be given as much text as clinical investigations.

Report of a Working Party on Anaesthetic Explosions including Safety Code for Equipment and Installations. H.M.S.O. London. 2s. 6d.

The Working Party was appointed in August, 1953, to consider the causes of anaesthetic explosions and to make recommendations for their prevention.

Their report states that between June, 1947, and June, 1954, approximately 19,250,000 anaesthetics were administered in National Health Service hospitals, and for 5,220,000 of these explosive agents were used. During this period 36 anaesthetic explosions were recorded but it is possible that a greater number may have occurred since some hospitals might not have reported explosions that have had some obvious cause such as the use of diathermy with an explosive anaesthetic. Also, these figures alone do not give a complete indication of the problem as there are circumstances in which, because of the very real danger of an explosion, a non-explosive but more toxic anaesthetic must be administered. It is important to realise that during this period patients may have died because of the precautions taken to avoid an explosion, but these deaths were not strictly within the terms of reference of the Working Party.

It was concluded that the main cause of explosions is to be found in static electricity, and that it is very difficult to ensure that conditions are always such that a dangerous discharge of static electricity is absolutely impossible.

Other sources of accidents include sparking from defective electrical apparatus, or from some piece of equipment not obviously dangerous. The members of the Working Party which included eminent physicists and electrical engineers as well as anaesthetists, prepared a safety code (Appendix A of the Report) for apparatus used in anaesthetising locations. This code should be consulted by all persons who are responsible for the functioning, installation, maintenance or design of such apparatus.

Veterinary surgeons should not need to be reminded that operating room personnel must not smoke at their work, nor that gas burners must not be sited in locations where inflammable anaesthetics are used. Such simple precautions should be obvious to all but the Report emphasises that one of the chief difficulties to be overcome if explosions are to be avoided is the lack of any general consciousness of danger.

William Harvey: His Life and Times; His Discoveries: His Methods. LOUIS CHAUVOIS. Hutchinson Medical Publications, 1957. Pp. 263. 25s.

When William Harvey went to Cambridge as a medical student he was fortunate in entering a College which enjoyed a special privilege. Each year the bodies of 2 hanged felons were presented to Caius for dissection; an exception to a law of the 17th century which forbade the opening of dead bodies. On his appointment as Lumlican Lecturer to the College of Physicians Harvey was granted the same privilege, but his lecture notes make his difficulties clear. "We have not more than 3 or 4 days in the year" he said, "when we are authorized to dissect publicly the corpses of a few criminals." "Not to speak of anything which can be explained without the body or can be read at home," he wrote in his notes. "Not to enter into too much detail or into too minute a dissection, for time does not permit."

It is in these notes that his discovery of the circulation of the blood is, apparently casually, mentioned for the first time. After discussing the abdominal viscera he went on:—

"It is plain from the structure of the heart that the blood is passed continuously through the lungs to the aorta as by the two clacks of a water bellows to raise water . . . whence it follows that the movement of the blood is constantly in a circle and is brought about by the beat of the heart."

These notes were written 12 years before the publication of "De Motu Cordis." Harvey must have been prepared for the storm of criticism which greeted it, for in those days the original and the unorthodox walked dangerous ground. A few years before Harvey's birth another great anatomist who challenged the current beliefs had been ceremoniously burned at the stake.

This biography falls into two parts, an account of Harvey's life and an account of his work. The author is a distinguished medical historian who gained the *Prix d'Histoire et de Philosophie des Sciences* in 1955, but it must be confessed that this reviewer found the first part of the book difficult to read. The author's immensely wide reading is obvious throughout, but the writing is weighed down with a mass of irrelevant information. The translation follows too closely the original French, and a

(*Concluded from facing page*)

salaried partner may be given rights as a partner which were never intended; on the other, he may involve himself in responsibility equally unintended. For example he might be liable as a partner for the income-tax on his senior partner's profit and for the firm's debts.

good many facts are included that the English reader might be expected to know.

The second part is entirely admirable. Harvey's works are analysed in close and interesting detail. "The more we read Harvey and penetrate into his mind," writes Dr. Chauvois, "the greater his figure seems to loom up through the ages. Greater than has as yet been acknowledged or numbered, he is, without shadow of doubt, among the 3 or 4 master intelligences of all time."

Biochemical Individuality. By ROGER J. WILLIAMS. John Wiley & Sons., New York. Chapman & Hall, London, 1956. Pp. 214. Numerous illustrations. 46s.

This is a most interesting book into which followers of many different crafts may dip with profit and pleasure, for though the title may suggest that it deals with the complexities of biochemistry, its subject matter covers a wide range of biological topics. No veterinary surgeon, no matter when he qualified nor how little biochemistry was included in the curriculum in his day, need believe that the book is too specialised for him.

The author, an eminent American biochemist, has outstanding personal qualities, of which this book is a reflection, far more so than is the case with most scientific books. Elsewhere he has described how the work of a lifetime tended to be moulded by two chance circumstances: firstly, his defective eyesight limited the amount of reading he was able to do, for which reason he was compelled to think for himself—more than is usually the case; secondly, his first research problem was concerned with attempts to grow *single* yeast cells. Individuality has thus been stamped on his work and thought over some 4 decades.

Professor Williams begins with two short chapters dealing with the medical and biological significance of biochemical variation, and with its genetic basis. Most veterinary surgeons, however, may not "dig-in-their-teeth" until the third chapter, which covers at length anatomical variations and their significance. This chapter includes numerous striking illustrations by way of examples.

The following chapters deal with individual variations of composition, enzymic patterns, endocrine activities, excretion patterns and pharmacological manifestations. Nutritional idiosyncrasies are also described at some length. In the first 176 pages the author thus presents his data, which he then proceeds to discuss philosophically in the final 3 chapters. These are concerned with the significance of individual variations in the biological sciences, in medical and dental fields and in psychiatry.

There may be the odd doubter in the field of veterinary medicine who wonders how important this kind of problem may be to him: he may feel that herd problems rather than those of the individual distinguish human from veterinary medicine. To such doubters one can but point out that the great majority of the animal breeding programmes, which are being carried out in various parts of the world, are based on the individual: we cannot afford to ignore work of this kind.

Each of the 14 chapters has its bibliography, so that this is a useful source book. What makes it more important is that Professor Williams has drawn on the experience of many eminent colleagues in collecting his data. The reviewer has not noticed any factual errors and, in any case, when the subject is so extensive and is presented with such enthusiasm, occasional errors would be of little significance. One cannot say the same of all books.

A Weasel in my Meatsafe. PHIL DRABBLE. Collins 14s.

Phil Drabble, in his preface, expresses the belief that there are a great many people who would have developed similar tastes to his own, if they had been confronted with the same set of circumstances in childhood.

Living, as he did, on the edge of a large town without companions of his own age he sought his pleasures from the nearby fringe of open country and developed an intense interest in wild life from the newt upwards.

Be that as it may, not many could have given us so entertaining, yet so factual an account of the making of an amateur naturalist and the way in which he has set about taming, rearing and watching a varied selection of our British wild animals and birds.

His observations are set down with complete candour and a refreshing lack of sentimentality. His failures and mistakes go down along with his successes and some penetrating comments on his fellow men from his prep-school biology master to his disreputable but colourful friend Hairy Kelly the rat catcher.

For those who aspire to keep such creatures as owls, jackdaws, rats, badgers, polecats and weasels, not merely in cages but under conditions of comparative freedom and mutual trust there is a great deal of sensible advice on a purely practical level to be gleaned from this book.

Even those who to quote the author "are so constipated with convention that they regard the idea of having a badger in the house as more than a little eccentric" may enjoy reading about it.

Veterinary surgeons, in particular, who are apt to be confronted by the unusual pet and expected to handle it, even if the owner is manifestly unable to do so, may derive considerable and painless profit from Mr. Drabble's account of being bitten by his polecat while rehearsing a children's hour TV programme and the ferreter's tricks he employed afterwards to re-establish mutual confidence.

The serious student of animal behaviour may have momentary regrets that Mr. Drabble has not, at times, gone a little deeper into the science of his subject.

Nephews, nieces, youthful clients and others of like mind will have no such inhibitions to their enjoyment.

Only parents if they are not of similar tastes should be warned that their offspring upon reading this book will probably turn up next moment with anything from a newt to a weasel and demand for it the hospitality of house and garden.

News and Comment

VETERINARY PARTNERSHIPS

May we draw our readers' particular attention to the revised guide to partnerships which is published in this week's issue of THE RECORD? It is the result of a great deal of careful work and thought on the part of one of the standing committees of the B.V.A., and it has, of course, been approved by the Association's solicitors.

Partnerships between professional men, by their very nature, may easily contain the seeds of future difficulty. Because of the probity which each would-be partner assumes in his colleague, a gentlemen's agreement may take the place of properly drawn legal arrangements. No matter how scrupulous the parties may be, pitfalls are more likely to result from an honourable obligation than from a contract, and the article published on another page rightly stresses this point.

Other matters of direct concern to partners, or to those thinking of going into partnership, are the substantially greater liabilities incurred by partners as compared with assistants, the possibilities of friction, financial or practical, and the complexities of income tax. These and other matters are all dealt with in the revised guide, and should be subject to proper agreement and understanding from the outset. A partnership is, *au fond*, a business matter, and sensitivity about seeking a solicitor's advice rather than "taking each other's word for it" is misplaced.

It is hoped that the guide will be of real value to veterinary surgeons; and reprints of it are obtainable on application to the General Secretary of the B.V.A.

THE WELLCOME TRUST

The Wellcome Trustees have made a grant of up to £80,000 to the Government of Kenya towards the cost of building and equipping a special establishment for research on foot-and-mouth disease in that country. The Institute, which will be sited in the Nairobi area, will be under the control of the Kenya Veterinary Department and will be in the charge of Mr. J. W. Macaulay, F.R.C.V.S., B.SC., D.V.S.M. It will be known as "The Wellcome Institute for Research on Foot-and-Mouth Disease."

THE REGISTER OF VETERINARY SURGEONS

Under the provisions of Section 17 (3) of the Veterinary Surgeons Act, 1948, the name of William Tempest Olver, J.P., Coton Lodge, Tamworth, Staffs., was restored to the Register of Veterinary Surgeons on July 22nd, 1957.

R.A.V.C. ONE-DAY HORSE TRIALS

On August 24th the Royal Army Veterinary Corps are again holding their One-day Horse Trials at their Training Centre, Melton Mowbray, and, as in previous years, an exciting day's sport should be provided.

The R.A.V.C. depot lends itself to such an event and Midlanders in particular will have the chance of seeing this very varied sport on their doorstep. Dressage arenas, show jumping ring and cross-country course are within 200 yards of each other, and a hill provides a natural grandstand so that, in the event of wet weather, spectators can see almost every fence from their cars.

In past years spectators have been able to see such well-known competitors as Miss Diana Mason and her Tramella, and Lt.-Col. Frank Weldon and Kilbarry. Entries so far this year include Miss Sheila Wilcox with her High and Mighty, and other potential members of the British international team now training at Windsor.

Open, civilian and military intermediate and preliminary classes will be held, and the open class will provide the only opportunity of riding the new Harewood dressage test before the Harewood trials (September 5th to 7th).

PERSONAL

Births

GLYN.—On July 29th, 1957, to Christine (*née* Wortley), wife of Michael Glyn, M.R.C.V.S., at Green Hedges House, East Grinstead, Sussex, twin sons.

WATSON.—On July 30th, 1957, to Wilma, wife of William A. Watson, B.V.SC., M.R.C.V.S., of "The Maples," Pool Road, Otley, a son.

Marriages

BEESLEY—KEABLE.—On July 13th, 1957, at St. James', Snitterfield, Stratford-on-Avon, Colin James Beesley, M.R.C.V.S., 187, Broad Lane, Coventry, to Constance Elizabeth Keable, Meadow View, Charlecote, Warwick.

OWEN—GREEN.—On July 27th, 1957, at Trinity Methodist Church, Nassau, Bahamas, Laurence Owen, B.V.SC., F.R.C.V.S., to Sonia Green of London.

Mr. A. L. C. Thorne, Senior Veterinary Research Officer, Federation of Nigeria, has become Deputy Director of Veterinary Research, Federation of Nigeria.

LEGAL NOTE

In an action at Stafford County Court last week a Stafford farmer claimed that a beef carcase had wrongly been rejected by the Public Health Inspector for the Stafford Rural District Council as being unfit for human consumption. The plaintiff was Sidney Kenderdine, of The Grange Farm, Ellenhall, near Stafford.

Mr. Kenderdine said one of his Friesian cows broke a rear hind leg and he decided to send it to Mr. Richard Fenton, of Sandon Bank, near Stafford, for immediate slaughter.

Mr. Fenton had notified the Council Inspector in accordance with the regulations. He said that, in addition, the beast was examined by a veterinary surgeon soon after slaughter, on the evening before the inspector visited the slaughterhouse. After examining the carcase, Mr. G. M. Lawton, the inspector, informed the witness that he had rejected the carcase as being unfit.

He had examined the organs and was of the opinion

that the carcase was unfit because it showed signs of fever. A second veterinary surgeon had said there were no signs of fever over 24 hours after slaughter.

In finding for the defendant (the Public Health Inspector) the Judge said he was not casting any reflection on the veterinary surgeons in accepting Mr. Lawton's evidence. By taking the action he did Mr. Lawton did not cause any damage to the carcase nor depreciate its value.

FOOT-AND-MOUTH DISEASE RESEARCH INSTITUTE

The Minister of Agriculture and the Secretary of State for Scotland, after consultation with the Agricultural Research Council and the Medical Research Council, have jointly appointed for a term of four years ending March 31st, 1961, Professor H. G. Lamont, O.B.E., D.SC., M.R.C.V.S., and Professor H. B. Maitland, M.D. (TOR.), M.SC., as members of the Governing Body of the Foot-and-Mouth Disease Research Institute, in succession to Dr. R. E. Glover, M.A., B.SC., F.R.C.V.S., and Professor E. T. C. Spooner, M.D., M.A., M.R.C.S., who have retired from the governing body.

The Ministers wish to take this opportunity of expressing their appreciation of Dr. Glover's and Professor Spooner's valuable services to the development of research into foot-and-mouth disease.

COMING EVENTS

August

25th-31st. 75th Annual General Meeting and Congress of the B.V.A. at Cambridge.

In Parliament

Pigs (Artificial Insemination)

MR. DE FREITAS (July 25th) asked the Minister of Agriculture, Fisheries and Food what he is doing to encourage artificial insemination in pig breeding.

THE JOINT PARLIAMENTARY SECRETARY TO THE MINISTRY OF AGRICULTURE, FISHERIES AND FOOD (MR. J. B. GODBER): Further research on technical problems is still necessary before a commercial service of artificial insemination for pigs can be established. This research is being conducted by the Agricultural Research Council working in close association with 4 cattle A.I. centres which are operating pilot schemes. There is also experimental work at the centre operated by my Department at Reading. Provision to enable the Milk Marketing Board to undertake an A.I. service for pigs is included in the Agriculture Bill that is now before Parliament.

MR. DE FREITAS: Is the Minister aware that the artificial insemination of cattle is a development which has had an enormous effect in improving cattle? Does he agree with that suggestion, and does he realise that pig breeders are very disappointed at the apparent lack of enthusiasm for a similar development for pigs?

MR. GODBER: I would agree entirely with the first part of the hon. Gentleman's supplementary question, but I would remind him that in respect of pigs there are technical difficulties that do not arise with cattle.

Fluorosis

MR. ELLIS SMITH (August 1st) asked the Minister of Agriculture, Fisheries and Food (1) if he will now make a full report, in accordance with the several promises made to the hon. Member for Stoke-on-Trent, South, including the promise made in April, 1953, on the problems which arise from industrial fluorosis with its effect on vegetation and animal life; (2) if he will make a full statement or publish a White Paper on the results of the research based upon the observations on cattle which began in September, 1953, at the Fenton Manor Farm, including the effects of fluorosis on teeth, bones, milk, and on the development of the calf; and what further action it is intended to take.

THE JOINT PARLIAMENTARY SECRETARY TO THE MINISTRY OF AGRICULTURE, FISHERIES AND FOOD (MR. J. B. GODBER): My Department's concern with this problem lies in trying to find a remedy for fluorosis in farm live-stock, and in giving farmers the best advice we can meanwhile. A full report on the work at Fenton Manor Farm cannot be made until the experiments have been completed, which will probably not be before the end of 1959. Meantime, the hon. Member has already been provided with 2 interim reports, and I will continue to keep him informed of the progress of the work.

Slaughter-houses (Design)

MR. CHAMPION asked the Minister of Agriculture, Fisheries and Food if, in his draft regulations prescribing standards for slaughter-house design, he will ensure that adequate provision is made for suitable accommodation and space for meat inspection, following the best European standards.

MR. GODBER: Yes, Sir. Adequate provision for meat inspection will be required.

MR. CHAMPION: Who is the hon. Gentleman consulting in this connexion? Will he consult the British Veterinary Association, which has an exceptional knowledge in these matters, as well as others?

MR. GODBER: We have consulted a very large number of bodies. Without notice I could not be certain, but I should have thought that the B.V.A. would have been consulted.

MR. KIMBALL: Can my hon. Friend say when these draft regulations will be published, because the intolerable delay over publishing is causing the greatest inconvenience to local authorities and the meat trade generally?

MR. GODBER: Yes, Sir. I am aware of the need, and I hope that recommended standards in the form of these draft regulations will be published as a White Paper next week. If we get that, I am sure that it will be helpful to all those whom my hon. Friend has in mind.

MR. WILLEY: Does the Minister realise that there will be an awful row if his right hon. Friend does not introduce legislation about slaughter-houses next Session?

MR. GODBER: I realise the concern of the hon. Member and of the House in this matter. I share that concern.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Essex. Chamberlaynes Farm, Clavering, Saffron Walden (July 30).
Lancs. Home Farm, Gorsey Lane, Bold, Widnes (July 29).

Foot-and-Mouth Disease

Suffolk. Butley Abbey Farm, Butley, Woodbridge (July 31).

Fowl Pest

Lancs. Sandy Way, Sandy Lane, Holmeswood, Ormskirk (Aug. 1).
Suffolk. Bridge Farm, Haughley, Stowmarket (July 29); 1, Red Brick Cottages, Long Thurlow, Badwell Ash, Bury St. Edmunds (July 31).

Swine Fever

Bath. Lewmead Piggeries, Brassmill Lane (July 30).
Berks. East Shefford Farm, Newbury (July 31).
Dorset. The Poultry Farm, St. George's Road, Fordington, Dorchester.
Kent. Gladmont Farm, Tunbury Avenue, Walderslade, Chatham (July 29).
Lincs. No. 2 Holding, Shillakers Farm, North Drove Bank, Spalding (July 30).
Norfolk. Barn Hill, Strumpshaw, Norwich (Aug. 2).
Salop. Brookside, Pulberbatch, Shrewsbury (July 29th).
Somerset. Piggeries, The Slate, West Town, Bristol (Aug. 1).
Staffs. Needwoodside Farm, Tatenhill Common, Burton-on-Trent (July 31).
Suffolk. Dock Farm, Boyton, Woodbridge (July 31).
Worcs. Piggery, Birch Road, Warley, Oldbury (July 29); Hill Farm, Woodcote, Bromsgrove (Aug. 1).
Yorks. Manor Farm, Bolton on Dearne, Rotherham (Aug. 2).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Ring Womb

Sir,—On reading Mr. Straiton's article on calving and ring womb I conjured up a picture in my mind of a studious, alert, deep-thinking but practical Scot pondering on the problems of veterinary practice and marrying the art with the science up to a point.

His comments on the advantages of the radio telephone, and a claim to have covered 96,000 miles in a year, *i.e.* an average of 260 miles every day, rather changed that picture.

Imagine the picture I now have of Mr. Straiton in his 100 m.p.h. car after covering 300 miles a day for 7½ months with his father gripping a bottle of water under the dashboard. Remember he has had little more than 1¾ hours' sleep per day and a 10-minute breakfast, and it is reasonable to assume that he did not waste time on such luxuries as a bath or a haircut. If only I were a Ronald Searle. Oh—the suspense of waiting for what the next chapter in the driving career of Mr. Straiton may reveal! Did he break the sound barrier?

And now, Sir, may I be permitted to comment upon your addendum regarding Mr. Straiton's 100-m.p.h. car? Surely the editor of a journal should allow replies in the first instance on a controversial matter without comment? To add such a comment to the correspondence column is very derogatory to the correspondents and therefore logically shows bias in favour of Mr. Straiton.

Further, the passing of such a comment shows, in my opinion, gross ignorance of conditions of driving in veterinary practice, *e.g.* driving in country lanes, farm roads and yards, reversing, traffic, etc., no matter what the capabilities of the car on a straight, level, and clear road; or were you being sarcastic?

Yours faithfully,
C. L. E. HAMBROOK.

The Halstead Hotel,
Halstead,
Essex.

July 29th, 1957.

Two-way Radio Telephones

Sir,—We have been using 2-way radio for about 5 years and are very pleased with it. We found in post-war veterinary practice the proportion of urgent calls seemed to have increased and our carefully planned, daily routine was being continually upset by them. In spite of making full use of the telephone we found that information was often not reaching the right person at the right time, and a "flap" was usually the result. We began to think of better ways of passing the required information.

It seemed that 2-way radio might be the solution to our problem, and we made enquiries about it. Our local ambulance service proved most helpful, as their work seemed to be rather similar to our own—a certain amount of planned daily routine liable to interruption by emergency calls. We visited the control room, were most impressed with the performance of the equipment, and noted especially the easy way in which emergencies were dealt with. It was difficult to work out the economics of the system because their statistical records were rather different from our own, one of the chief factors being the number of miles travelled per patient. We were, however, interested to learn that the number of vehicles required before using 2-way radio had been 12 ambulances and 5 cars, though this had been reduced to 10 ambulances and 4 cars.

We next got in touch with one of the suppliers of this equipment who sent out representatives to give us a demonstration. A set was temporarily installed at our surgery and a car visited various points in the practice. The performance was very satisfactory and we decided to purchase the equipment. At the time we started using it our assistant had left and we were surprised to discover how easily we managed without him. It became apparent that our calculations on mileage saving were unimportant, and the saving of time was the more important factor.

Whilst we find 2-way radio extremely useful, it is not easy to say how useful it would be to other members. Much depends on the type of practice, the nature of the work, and its organisation. We

felt that if we explained how we came to use the apparatus, it might help members to judge for themselves. We still have " flaps " but these are rather infrequent. We find we are able to take the emergencies in our stride rather than have our planned routine upset by them. We can speed up a round of visits if things are " brewing up " in the practice or take it more leisurely if all is quiet. We can accept the invitation to a cup of tea without the anxious feeling that an urgent call may be waiting. We can even enjoy the relaxation of a village cricket match for half an hour or so without feeling we are playing truant. In fact we really can feel we are in charge of the practice with all its urgencies and emergencies rather than feel it is in charge of us. As we have said, we ceased at an early stage to make calculations of economy in terms of mileage but rather in terms of time. We now realise that peace of mind, and reduction of stress and anxiety are very important considerations, and perhaps our appreciation of the real value of this equipment should lie in this direction.

Yours faithfully,
T. J. MORGAN,
J. H. McGHEE.

46, Coten End,
Warwick.

August 1st, 1957.

Sir,—Please don't be angry with your professional colleagues, Mr. Straiton, for being almost incredulous of your super-human feats of endurance. Country practitioners are a rather unprogressive lot, and probably we shall take years to adapt ourselves to the atomic age.

You see, only so short a time ago as in our youth, " Around the World in 80 Days " was looked upon as sheer fantasy. Now we find Mr. Straiton ripping the journey off four times a year as part of his ordinary day's work.

Anybody can calculate this fact given the basic figures of 365 days in the year, 22,000 miles circumference of the world at the Equator, and 96,000 miles per annum in practice.

Yours faithfully,
F. B. EDWARDS.

" Newgate,"
Llanbrynmair,
Mont.

July 29th, 1957.

Sir,—What a pity Mr. E. C. Straiton has no wish to write his autobiography in THE VETERINARY RECORD. It would have made fascinating reading.

He has now reached a mileage equivalent to 109,000 miles per year, during a really hot spell of 7½ months " Veterinary Science." Is this a record?

Yours faithfully,
C. STEELE.

65, Seaview Road,
Wallasey,
Cheshire.

July 29th, 1957.

Sir,—I am surprised and indignant at the attitude adopted by your correspondents towards Mr. Straiton's declaration of mileage. Why should anyone question the figure of 96,000? I average well over 200,000 miles per year; and no doubt Mr. Straiton has evolved a technique rather similar to my own.

Let me explain how it is done; organisation, allied to modern methods, is the key.

At the crack of dawn I am wakened by my secretary (who is also my telephonist, receptionist, floor-scrubber, dish-washer, clipper, stripper, and wife). I leap from the connubial couch and slide down a greased pole (fire-station style) to the garage below. One touch of the starter, the engine throbs into life, and I am on my way.

During the first 10 miles I manage to dress, tie my bootlaces, and say my prayers. In the second 10, I shave (off the battery), wash (off the windscreen-washer), and Brylcreem my hair.

First call—a tuberculin test, for instance. The herd is assembled in the yard. My Weybridge Tuberculin is neatly packed in .1 c.c. plastic pellets which I fire from a special syringe-gun (patent applied for) into the willing herd. Round and round the yard I drive, each pellet, red and blue, finding its proper mark with unfailing accuracy. Skin measurements and ear numbers? Fitted into my super-charged Model T, I have a radar telescope (patent pending) which enables me to take measurements and read ear numbers at a distance of 50 yards (Ministry of Agriculture, please note). Injections completed, I reverse down the farm road at top speed.

My next case—say, one of indigestion. Seated in my car, which I keep circling round the yard, I ascertain—by means of a 2-way megaphone—the symptoms, history, and duration of the condition—sometimes I am even told the species. Spot diagnosis, as taught at College, enables me to prescribe quickly. A bottle or a packet of powders flung through the window, a word of encouragement, and I am off again.

Next, a dehorning session. Fitted to my front wings, rather in the manner of Queen Boadicea's chariot, I have 2 rotating blades (patent applied for, but refused by Ministry of Transport) that can sweep, swipe, shear, and slash at all angles. With these in action, I advance upon the horned herd. Round I go in ever-widening circles, while the field becomes strewn with horn, great and small, the odd scalp, and the occasional ear that gets in the way of my blades. Apart from this last, the job is well-nigh perfect and highly professional in execution. Anaesthesia? After years of research, I have perfected a technique of Veterinary Telepathic Hypnosis which renders the animals insensitive and makes the use of ordinary anaesthetics quite superfluous.

And so on it goes; case after case, mile after mile, till the end of the day and far into the night. Can you wonder that my mileage mounts up? Meals are consumed *en route* and take the form of predigested protein and carbohydrate capsules, laced with vitamins, minerals, and trace elements.

If my mileage tends to fall below average, I have

the car jacked up before I retire, and I leave the engine and wheels running all night. This, in the days of petrol rationing, I felt to be a patriotic duty in that it saved the extra fuel normally consumed in starting off with a cold engine.

There, Sir, you have the whole picture; and I only hope that those who cast doubts on Mr. Straiton's modest figure will now feel ashamed of themselves and act accordingly. Or, as they say in Tonypandy, *Savoir tout c'est pardonner tout.*

Yours faithfully,
DONALD BAIN.

The Bungalow,
Oldmeldrum Road,
Newmachar.
Aberdeenshire.

August 1st, 1957.

Sir,—Mr. Straiton really should not complain if your readers find it impossible to swallow his astronomical mileage statistics without difficulty. He should accept their incredulity as a compliment, and as a measure of the gulf that separates his achievement from the experience of the broad generality of practitioners. I contend that Mr. Straiton, at his busiest, has outstripped in road mileage the combined efforts of 3 really busy veterinary surgeons. This is no mean feat—one that none have yet claimed to equal, or even to approach. But, surely, critics need not be accused of jealousy on this score. I do not believe that anyone else would voluntarily subject himself to such ruthless and senseless self-punishment.

Mr. Straiton complains that he seems fated to stir up controversy. Yet he is determined to keep the pot boiling. In seeking to lay the mileage ghost he raises several new controversial issues. Could these be red herrings designed to lure critics into deeper waters where fish may manoeuvre with greater ease?

Yours faithfully,
R. R. ROBERTSON.

Acacia House,
Minsterley,
Shropshire.
August 1st, 1957.

The Use of Frozen Semen from Farm Bulls

Sir,—As far as can be ascertained no frozen semen fertility results of a private breeder service have yet been published. In January, 1955, the Hampshire Cattle Breeders' Society had achieved a 3- to 4-month conception rate of 61 per cent. on 22,960 first inseminations with frozen semen from the bulls of their stud in routine A.I. use.

A service for farmers' bulls was inaugurated, special facilities being provided for processing and storage. Practitioners will be interested to hear of the varied advantages to which the farmer has put the service. (a) He retained his individual choice of bull but at the same time obtained the manifold established advantages of A.I. (b) Disease-free stocks of semen prior to exposure to infection were processed. (c) More widespread use of young bulls and bulls incapable of facile natural service was made. (d) Bulls too violent for small heifers or to handle safely were used. (e) Insurance against temporary inactivity through injury or disease, or against total loss was achieved. (f) Invaluable convenience and, in certain cases, considerable financial reward were gained. Upon application to the Ministry, Article III Licences enabled the owner to sell the services of his bull in other herds on a scale previously limited considerably by the risk of disease introduction and the hazards of transportation.

The processing was as outlined by Polge and Rowson (1951). In 2 years 12,390 ampoules were frozen using semen from 85 different bulls (30 Guernsey, 16 Friesian, 16 Jersey, 8 Ayrshire, 8 Shorthorn, 4 Aberdeen Angus, 2 Kerry, and 1 Dexter).

Results February, 1955, to January, 1957

No. of first Inseminations	No. Held	3- to 4-month C.R.
1,453	814	56.0 per cent.

In the course of the period reported upon, vibriosis was confirmed in 17 of the bulls involved. The frozen semen did not contain antibiotics and therefore it provides interest to separate the results obtained by contaminated bulls and those apparently free from infection.

	No. of 1sts	No. Held	3- to 4-month C.R.
Infected Bulls	517	230	44.5 per cent.
Clean Bulls	936	584	62.5 per cent.

It is as well to bear in mind that the group of "clean" bulls may include other infected bulls as yet undiagnosed. Similarly, regard should be paid to the fact that no other disease was checked for, where poor results were obtained.

Yours faithfully,
D. H. L. MADDEN,

The Hampshire Cattle Breeders' Society, Ltd.,
Artificial Insemination Centre,
Lyndhurst,
Hants.
July 29th, 1957.

Why Not More Principals?

Sir,—The large number of letters following Mr. Straiton's comments about conditions in general practice suggest that a great many who are so engaged are not altogether satisfied with their lot at the present time.

I wonder if there may be causes for discontent other than those of fees and salaries?

During the past 15 years or so it seems to me that the married assistant with 5 or more years' experience has become increasingly common, and in some instances 3 or even 4 may be found in one practice—some, perhaps, having the title of "salaried partners."

If this is in fact the case—and I am sure it can easily be proved or disproved from statistics—I think it might be profitable to find out why this has come about. It seems to me desirable that the largest

possible proportion of experienced members engaging in general practice should do so in their own right.

It must be most confusing for the general public to find that there are two kinds of veterinary surgeon: one who practises under his own name and one who uses the name of A. N. Other.

Yours faithfully,
ROBERT S. MOIR.

St. Margaret's,
Eaglesfield,
Lockerbie.

August 4th, 1957.

A Point of Meat Inspection

Sir,—I was presented with a sheep's hock by an Inspector of the Local Authority something over a month ago and asked to give an opinion as to the age of the animal.

Ever since, I have been trying to find someone who could tell me; but although the specimen is by now well travelled, I have been singularly unsuccessful. Could anyone please tell me what organisation or person would be able to give me the required information?

Yours faithfully,
J. A. WHITE.

Commonwood House,
Riverford,
Crownhill,
Plymouth.

July 16th, 1957.

A Scale of Professional Fees

Sir,—For one whole month we have been subjected to a great deal of correspondence on the 2-way telephone which, in itself, would have been quite enlightening and informative. However, the last two editions of THE RECORD have contained letters which, although purporting to relate to that subject, have had but one object—namely the lampooning of a Mr. Straiton.

I neither know Mr. Straiton nor do I know anything of his practice, but it is certainly feasible that an industrious practitioner with an understaffed practice could cover the mileage claimed. In any case, it seems nonsensical that a colleague should deliberately attempt to mislead us on this point. Furthermore, I do not think that the Association's official journal does itself any credit by reproducing in its pages peurile little rhymes and other sarcastic letters questioning the veracity of a colleague's statements. Constructive criticisms on a particular subject by all means, but please let us keep personal "slanging matches" out of our journal.

One last point: professional status was brought up in the last half of Mr. Straiton's letter of July 27th. I am inclined to believe that all younger members of the profession at least would endorse his views. To my mind (mercenary or otherwise!) status and income go hand in hand.

At the moment, we are the "poor relations" as far as the professions as a whole are concerned. As veterinary surgeons the income we derive is commensurate neither with our labours nor with the important benefits we confer upon the economy of the country. To quote a favourite cliché of the present Prime Minister, farming in this country "has never had it so good." It can well afford to pay a higher and much fairer fee for our services.

As Mr. Straiton suggests, there should be a united and strong action taken now and, as I see it, a central advisory authority formed with the express purpose of determining such scales of charges as would give decent living standards to all members of the profession.

Yours faithfully,
D. BASINGER.

PS. Not being in private practice myself, I have no personal axe to grind!

Dutch Cottage,
Cold Norton,
Nr. Chelmsford,
Essex.

July 31st, 1957.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th July, 1957		9	—	4	40	—	75
Corresponding period in	1956	19	2	—	31	—	34
	1955	19	—	—	73	—	56
	1954	10	—	—	9	—	65
1st January to 15th July, 1957		236	5	28	495	—	530
Corresponding period in	1956	1,037	8	13	354	—	421
	1955	461	1	6	344	—	904
	1954	160	3	12	550	—	889

TUBERCULOSIS (ATTESTED HERDS) SCHEMES

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at 30th June, 1957, was as follows :—

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
99,680	35,911	41,014	176,605